

United States Patent [19]**Verkaart**[11] **Patent Number:** **4,759,749**[45] **Date of Patent:** **Jul. 26, 1988**[54] **HEATER FOR PHYSIOLOGICAL FLUIDS**[75] **Inventor:** Wesley H. Verkaart, Dubury, Mass.[73] **Assignee:** Level 1 Technologies, Inc., Plymouth, Mass.[21] **Appl. No.:** 866,910[22] **Filed:** May 27, 1986[51] **Int. Cl.⁴** A61F 7/12; H05B 1/00[52] **U.S. Cl.** 604/113; 128/399;
165/67; 165/156; 422/46[58] **Field of Search** 604/113, 114, 4, 53,
604/80, 82, 259, 322; 128/399-401, DIG. 3;
165/154, 156, 67, 68; 285/345, 231; 422/46[56] **References Cited****U.S. PATENT DOCUMENTS**

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A self-contained portable unit for heating physiological fluids is disclosed. A heat exchanger is disposable to ensure sterility, and the heat exchanger is attached to a heating system by inserting it between opposed fluid connection elements. One of the fluid connection elements is movable to permit the heat exchanger to be installed and removed easily by inserting one end of the heat exchanger in one of the fluid connection units and moving the other fluid connection unit into contact with an opposite end of the heat exchanger. The heating fluid is heated by an electric heating element and is circulated by an electric pump.

19 Claims, 5 Drawing Sheets